



Integrated Operations Control Center Platform (IOCC)

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01

Boost your adaptability to changes in daily operations

Airlines today demand tools that address changing market dynamics. Enhanced adaptability, integration, speed, and economies are essential. Stand-alone systems are not enough. Achieving operational and financial excellence requires new business models backed by proven technologies – the very essence of Lufthansa Systems' IOCC Platform.

Address changing operations and market demands

Given current market conditions, airlines must be able to adapt quickly and transform operations as needed. Rigid stand-alone systems neither facilitate adaptability, nor the necessary synergies and savings which every airline requires in today's competitive environment. Conversely, the Lufthansa Systems' IOCC Platform delivers on all counts.

This first fully-integrated IT platform features a modular architecture that bends and flexes with your internal operation, while accommodating external market condi-

tions. By linking your various business units with timely information and robust functionality, your airline's primary mission of transporting passengers and cargo to their destinations safely, punctually and profitably is facilitated. From schedule management, operations control, and crew management to flight planning and weight & balance, the IOCC Platform is suitable to increase operational and economical benefits unattainable with any stand-alone system.

In that regard your COO will note a pronounced improvement in day-to-day operations, accomplished with greater

Calculations based on specific customer usage scenarios demonstrate that even a mid-sized network airline with 90 aircraft can save 31.8 US million dollars a year by using the IOCC Platform.

speed and efficiency. The IOCC Platform is designed for streamlined and seamless operations boosted by fast and fiscally-sound decision-making: it provides the tools and data needed to assess and analyze various scenarios and options, and facilitates interface between business units.



The ability to run schedule management, operations control, crew management, flight planning and weight & balance on a common IT platform delivers countless benefits. Your CIO and IT staff will appreciate the scalable IOCC Platform for its role in helping meet user demands with increased flexibility. They will see its powerful strategy and innovative architecture at work in affecting a smooth migration from a legacy system to an integrated environment. They will recognize its positive effects on project planning and application optimization.

The IOCC Platform's modular architecture will also appeal to your CFO, who will note its role in reducing both: running IT and application costs. Further realization of its efficacy as a sound long-term investment will be evident in the need for less IT equipment, fewer interfaces, adaptations, and associated cost reductions.

Improve cross-departmental optimization and control operational complexity

Across all departments, a notable improvement in workflows, processes and decision-

making can be achieved through the IOCC Platform's effective data integration. Individual modules manage the complexities associated with cross-departmental operations. By intercepting potential disruptions, delays are reduced enabling work processes to advance. To promote optimum decision-making, the IOCC Platform presents the most cost-effective options, reflecting the best utilization of resources and minimum failure costs.



01

The IOCC Platform consists of three core elements:

■ **The IOCC components**

Integral to the IOCC Platform are its integrated components. These proven Lufthansa Systems solutions drive all airline operational processes from schedule management, operations control and crew management to flight planning and weight & balance. Typically, business units handling these areas work from different locations and use different communication channels; not ideal to achieving seamless information flow, particularly important in managing day-to-day disruptions and achieving safe, on-time arrivals for passengers and cargo. With the high percentage of changes airlines experience in their initial aircraft rotations (i.e., up to 70%), there is a loss of efficiency from initial planning to the day of operations.

The IOCC Platform's effective integration of data, processes and workflows addresses this problem by promoting faster decision-making, detecting and intercepting potential disruptions, and reducing delays. This is achieved through the platform's powerful optimization and recovery tools covering the complete time range from initial plan-

ning to day of operations without any gaps. Armed with the right information at the right time, staff can be more proactive in carefully weighing the alternatives and focusing on the most pressing issues. Optimal decision-making is facilitated through the IOCC Platform's presentation of the most cost-effective options, reflecting the best use of resources and reduced failure costs. Airlines can limit the effects of disruptions in advance and return to normal flight operations more quickly, even after serious interruptions. While achieving this higher level of efficiency and cost reductions, airlines benefit from increased customer satisfaction.

■ **IOCC Integration Layer**

The IOCC components dock into the platform's prefabricated, standardized and stable ESB (Enterprise Service Bus). It provides for the seamless exchange of data and communications between components. This layer also facilitates enhanced process integration and step-by-step, operationally-safe legacy system migration.

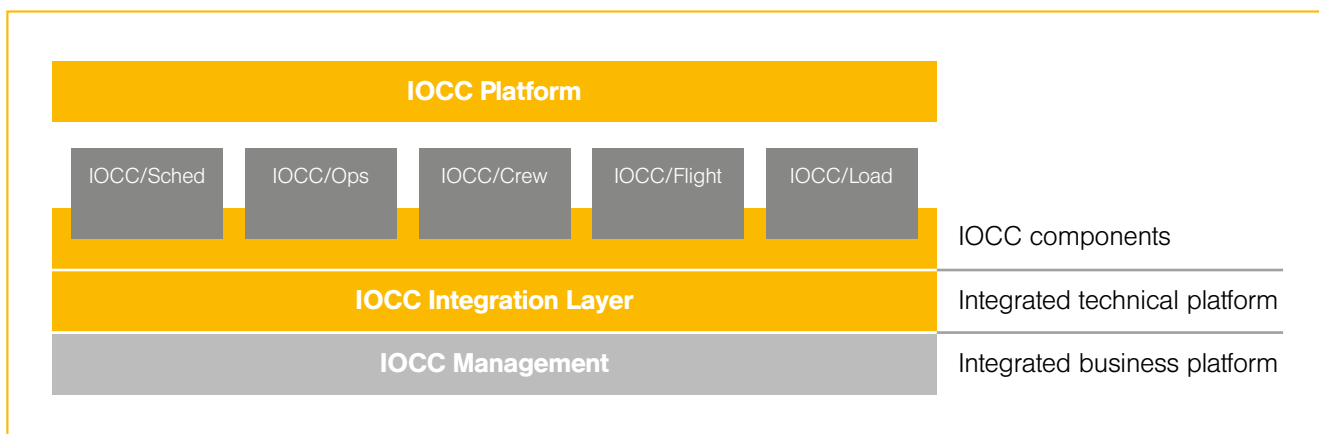
■ **IOCC Management**

Central to the integrated business platform is IOCC Management. Value-driven and based on multi-directional communica-

tions, it serves as the main decision-making component. The IOCC Platform strives to execute an airline's flight schedule as close as possible to the original plan. It recognizes obvious contingencies and/or disruptions that prevent 100% punctuality and adherence to planned parameters. It takes into account other schedules and plans that are managed by the various business units linked to the flight schedule (e.g., the aircraft rotation plan, pairing schedule, crew duty plan, etc.).

Moving to the IOCC Platform: a safe migration protecting your daily operation

Lufthansa Systems has developed a proven reliable, step-by-step process for migrating from a legacy system to the IOCC Platform. Its modular structure and leading, market-proven components and modules facilitate gradual migration achievable even under the most complex conditions. This contributes to a smooth transition with minimum risks. Further, the complexities associated with interfaces are reduced through the IOCC Platform's modularity resulting in streamlined adaptation needs, reduced potential errors and lower operating and maintenance costs. The IOCC Platform's unique architecture, customization by configuration and powerful



The core elements of the IOCC Platform

optimization tools, combined with its multi-dimensional, horizontal and vertical business process integration, afford faster adaptability and time-to-market functionality.

A fast ROI and a secure long-term investment

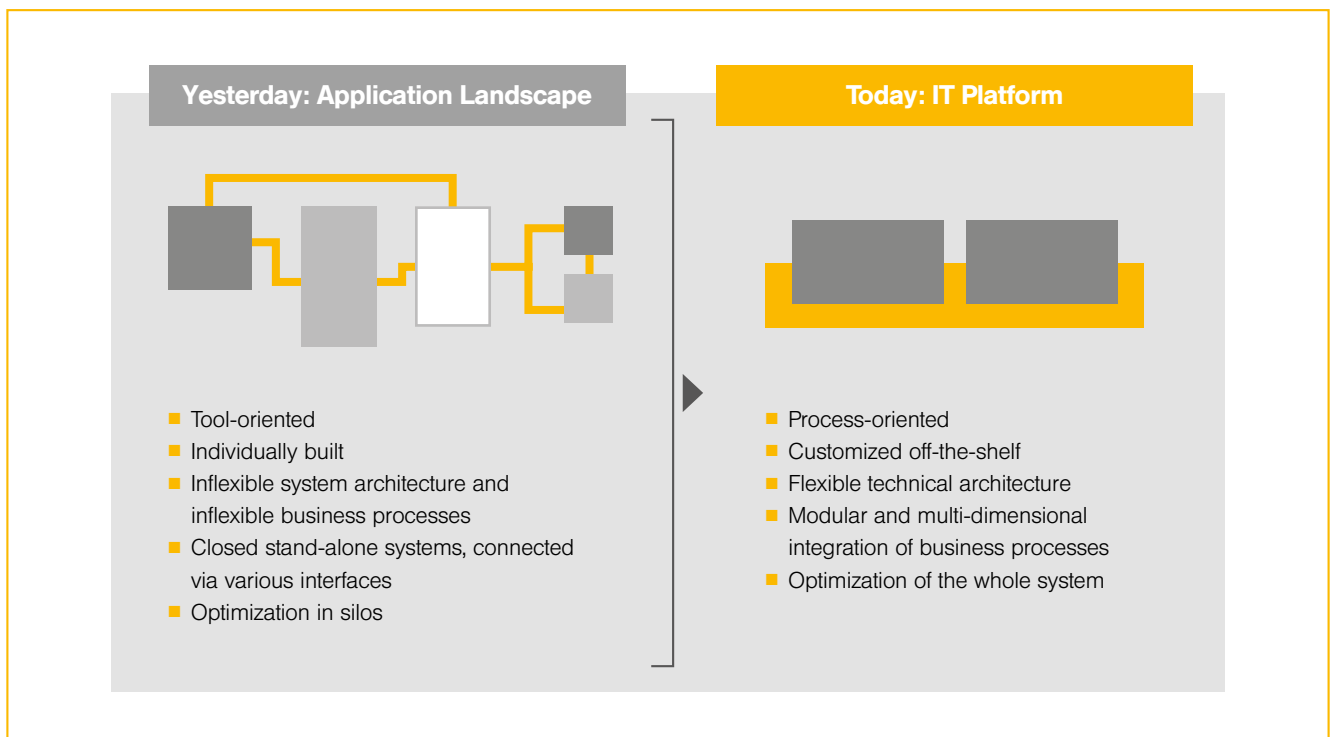
The Lufthansa Systems IOCC Platform strategy is designed for immediate cost reductions where applied and delivers a sound, long-term investment. From fuel consumption and fleet utilization to employee productivity, it promotes cost efficiency. By reducing the expenses for IT operations, adaptations, interfaces and innovations, the platform has the potential to reduce overall IT costs. There are also additional economic opportunities to be gained by your airline due to an improved ability to implement business model or service changes faster and at lower costs.

Lufthansa Systems delivers on its IOCC promise. Calculations based on specific customer usage scenarios demonstrate that even a mid-sized network airline with 90 aircraft can save 31.8 million US dollars a year by using the IOCC Platform. Just one year after the first components become operational, customers will realize a return on investment. As a whole, the airline industry could save well over one billion US dollars annually using the IOCC Platform.

Approximately 80 airlines worldwide are already optimizing their daily flight operations applying individual modules of the IOCC Platform. They are realizing such benefits as resource conservation, lower costs and the assurance that as many passengers as possible reach their destinations safely and on-time, even when the weather or air traffic control conspire against their operational plans.

Aviation IT is our business

Lufthansa Systems has a unique airline heritage and distinction. It is the leading international provider of airline IT solutions which have originated directly from the airline industry. This constitutes a major advantage for achieving targeted standardization. Like all our aviation IT solutions, the IOCC Platform reflects the quality associated with German initiative and skill. They convey the advanced core competencies and values that drive our product development and internal processes. These values are our attention to detail and ongoing emphasis on quality and reliability.



Airline IT will move towards platforms.

02

Core processes covered by IOCC



Schedule management



Operations control



Hub and turnaround management



Maintenance control



IOCC/Sched

Schedule management

Schedule management monitors and controls schedule planning during the final weeks prior to the flight event. At this point, schedules must already be set for crew and maintenance reasons. However, schedules are prone to disruption and frequently have to be modified and adapted to address changes in market conditions.

IOCC/Ops

Operations control

Operations control is responsible for controlling flight operations on the day of operations. An extremely complex process is required to achieve that passengers arrive at their destination safely and punctually. The operations control center is the traffic center of an airline. This is where all the data relevant to conducting a flight converges.

Hub and turnaround management

The hub or station control management monitors and controls aircraft, crew and passenger connections as well as the aircraft turnaround at its hub(s). By actively managing the seamless interplay between airport, airline and service providers, the propagation of delays caused by disruptions will be reduced significantly.

Maintenance control

Maintenance control monitors the allocation and observance of maintenance intervals as well as the execution of upcoming maintenance events. To be as efficient as possible, operation controllers and maintenance technicians need to be informed about all changes in operational activities without any delay and on a real-time data basis.

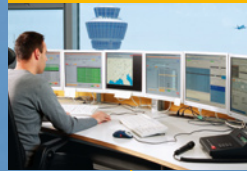
Passenger and cargo management



Crew management



Flight planning



Weight & balance



Passenger and cargo management

Unavoidable disruptions in flight operations occasionally result in the inability to transport passengers or cargo as planned. Passenger and cargo management's role is to achieve that the delayed passengers and cargo are transported to their destination as swiftly as possible with minimum inconvenience.

IOCC/Crew

Crew management

The crew management process covers the handling of planned duty rosters issued to flight crews. It must achieve that the right crew is always on duty at the right time and in the right place for every flight. As in the initial planning phase, particular attention must be paid to the requisite qualifications and legality of the crew in question.

IOCC/Flight

Flight planning

The flight planning process provides airlines with high-quality briefing packages and optimized trajectories from take off to landing. It covers all aspects of flight planning as well as flight following procedures. It calculates the optimal route between two airports while taking flight-related and all current aeronautical information including NOTAMs into account.

IOCC/Load

Weight & balance

Weight & balance as a process evolves around coordinating the planned weight and center of gravity of a flight. The weight for take-off, cruise and landing must be in strict control within the structural limits of the airframe. Additionally, the trim must be controlled to stay within the established parameters for a safe flight.

03

IOCC Platform by numbers

The Lufthansa Systems IOCC Platform strategy is designed to achieve immediate cost reductions in those areas where it is applied and delivers a sound, long-term investment. From fuel consumption and fleet utilization to employee productivity, the platform promotes cost efficiency.



1.6

A network carrier with 140 aircraft can achieve up to **1.6 million USD** per year in additional revenue through re-optimized fleet assignment.



1.75

A regional carrier with 80 aircraft has potential savings of up to **1.75 million USD** per year by improving maintenance intervals, ferry flights and punctuality as well as avoiding cancellations.



1.5

A mid-size carrier with 65 aircraft has a potential for improvements concerning punctuality by 5% through optimized operations and therefore can save up to **1.5 million USD** per year.

8

An airline with 2,000 crew members has a potential of savings of up to **8 million USD** per year by optimized pairings, reduced overtime and indirect crew costs.

5

Leading route optimization can reduce fuel consumption by up to **5%** and minimizes CO₂ emissions and overall flight costs at the same time.

2

Optimized loading and trim can result in up to 0.5% fuel savings per flight and can save up to **2 million USD** per year for a mid-size network carrier.

35

Eliminating the multitude of point-to-point links in a heterogeneous environment by an Enterprise Service Bus (ESB)-based communication can save up to **35%** of the ongoing IT maintenance costs.

04

Full-service from one source

Business software always needs a set of enablers which are necessary to derive full potential from the solution. You need working and harmonized processes surrounding your applications, a smooth migration, well-trained staff and a stable and reliable system operation. All this is delivered by one single source – Lufthansa Systems. You benefit from the proven reliable, high quality services from the airline industry’s leading full-service provider.

1 Consulting

Our consulting services support you in developing a modern IOCC. Based on our unique business process model we will design your individual set-up to foster the efficiency and effectiveness of all operational departments. It starts with an analysis of the current business processes and your future requirements. It results in a framework of optimized work processes, quality management and the design of a modern

IOCC location. Our team of experienced airline consultants walks you through all necessary phases and assists you in their concrete implementation. With Lufthansa Systems’ unique business process model you benefit from our best practice experience gained over years in numerous consulting and implementation projects, and compiled in that standard model.



2 Project and change management

Replacing long running systems is not only an IT challenge; it also demands careful attention to familiarize users with new processes and applications. Our project management is not only concerned with dates and deliverables, but also the risks. Long-standing experience and many successful implementation projects taught us how to manage associated risks, and are the basis for a neat cut over. Our permanent invest-

ment in project management know-how is your gain. Change management is generally underestimated. We design suitable and individual concepts for your organization. Our user-oriented trainings are executed by our most experienced specialists. Our understanding is that there is no better basis for a seamless cut-over without operational impacts.



3 Implementation and integration

Migration to a new-gen Integrated Operations Control Center Platform is simple and smooth – as long as you have a strong partner by your side. We have successfully implemented IOCC Platform components and modules at over 80 airlines to date. Our key success factors for migration projects are:

1. Staff: We employ experienced migration experts and first-rate specialists for each specific aspect and project phase.
2. Airline know-how: Due to our origins in

the airline industry and our extensive project experience, we possess the knowledge of processes and IT systems necessary for complex migrations in the airline sector.

3. Implementation and integration framework: We conduct our implementation projects founded on industry standard processes and tools for project management, complemented by additional IOCC-specific procedures. Special emphasis is given to integration into the existing airline IT environment.



4 Data services

Lufthansa Systems' airline expertise enables us to offer you reliable data services and the efficiency and safety required in the airline business. Our aeronautical database comprises all data of a non-proprietary nature, according to ICAO standards: meteorological and all static and dynamic data of the AIS (Aeronautical Information Service) domain. By maintaining your specific aircraft operator data in the flight planning data-

base, we enable you to focus on your main business by outsourcing time-consuming tasks such as maintenance of aircraft data, navigational data and routes, overflight permissions, etc. Our comprehensive aeronautical data services and maintenance of weight and balance basic data stand for completeness, accuracy, timeliness and traceability.



5 Operations and service management

Lufthansa Systems supports airlines of all sizes in all categories in setting up and operating powerful and reliable infrastructure in its state-of-the-art, ultra-high-performance data center. Lufthansa Systems' core competencies are based on complete data center services and range from server hosting to the implementation of entire outsourcing projects. Ongoing service management monitors the service performance. The service management is

responsible to the customer for managing the service delivery. Lufthansa Systems' service manager is the customer's contact for the provision of the agreed services and the consulting in all aspects of service delivery. Simply meeting contracted Service Level Agreements is not enough. Lufthansa Systems' unique service management approach is to achieve customer satisfaction.



05 Components of the

IOCC/Sched

NetLine/Sched

supports all aspects of schedule development and management by providing a powerful and easy way to visualize and modify schedules as well as to evaluate the feasibility and profitability of alternative network and scheduling scenarios.

- **Rotation Optimizer** establishes best possible aircraft rotations.
- **Slot Manager** takes over the complete slot handling process.
- **Slot Monitor** achieves absolute control of slot usage so that no slots are lost.
- **Tactical Profitability Evaluation Model (TPEM)** evaluates the medium to short-term contribution to profitability of schedule scenarios.
- **Flexible Reporting** offers the possibility to design user-defined reports on all aspects of schedule management.
- **Swapper** proposes capacity adjustments to maximize profitability while keeping schedule impacts minimal.

IOCC/Ops

NetLine/Ops

is designed in a manner that supervision of the daily operation and the maintenance schedule in a proactive manner is achieved. The system assists the operations controller in evaluating and solving problems in an intuitive way – legally compliant, fast and cost efficient. NetLine/Ops comprises powerful support for tail assignment, movement control, ATC slot handling, hub control and much more.

- **MaintenanceControl** provides full support for tail assignment and tactical and operational maintenance planning.
- **HubControl** is the tool for transfers and connections supporting the station operations control center.
- **OpsLink** is a web-based solution for safe and cost-efficient real-time access to operational data.
- **Operational Profitability Evaluation Model (OPEM)** evaluates the profitability contribution for schedule scenarios on the day of operations. It finds the best solution to schedule irregularities/changes and short-term capacity adjustments.
- **Tail xOPT*** achieves that the right aircraft is in the right spot at the right time.
- **Solver xOPT*** proposes a feasible, cost-efficient, revenue-oriented and passenger-friendly solution to operational irregularities.

IOCC/Crew

NetLine/Crew

supports the entire crew management process, covering all phases from pairing construction via crew assignment to crew tracking and postflight activities. With a set of optimizers and decision support tools, crew planners and controllers can create and maintain efficient duty rosters.

- **Pairing** facilitates initial planning and ongoing maintenance of pairings.
- **Assignment** creates and continuously maintains duty rosters within a highly automated workflow.
- **Tracking** manages day-to-day problems and flight schedule disruptions through powerful decision support, automated administration and real-time notification handling.
- **CrewLink** serves as the web-based remote interface for crew members for notification distribution, check-in/out, preferential bidding, trip trading, etc.
- **Pairing xOPT*** based on leading edge OR methods, it automatically creates efficient pairing solutions – also qualified for a seamless (re-)optimization environment.
- **Fairness xOPT*** based on the fair assignment philosophy, it automatically creates complete, well-balanced, stable, and legal roster solutions – also qualified for a seamless (re-)optimization environment.
- **Preferences xOPT*** in addition to fair optimization, the individual preferences of crew members are taken into consideration.
- **Crew Solver xOPT*** designed for seamless (re-)optimization, problem solving, and recovery of crew schedules – including the underlying pairing solutions.

IOCC Platform



Lido/Flight

caters to a wide range of applications for all planning phases in flight operations; strategic, long-term planning, daily operation and postflight analysis. Any operational flight plan can be generated either manually, fully automated or at any other level of manual intervention within the flight planning process. To enable an optimum solution, Lido/Flight offers a variety of integrated modules. For example:

- **Briefing** enables pilots to retrieve and print briefing documentation for their coming flight. It also allows them to select alternates, to calculate block fuel and to place a fuel order.
- **Inflight Monitor** informs users about all external influences affecting their flights and thus enables them to react in a flexible way and as early as possible.
- **TFR (Traffic Flow Restrictions)** integrates the dynamic restrictions applied to the airway structure published by ATC (Air Traffic Control). This allows for the most precise route selection by applying restrictions only when they are in effect as opposed to permanent restriction.
- **FreeFlight** plans the most efficient trajectory for each flight based on the current weather and airspace situation. The simple use of direct routings through free flight airspaces delivers up to 6% less fuel burn.
- **TakeOff** achieves optimum single point take-off performance calculations integrated into the flight planning process.



NetLine/Load

handles the weight and balance process of an airline in an integrated and efficient way. It keeps track of all the updates from relevant partners that interact before the flight departs: reservations, cargo, flight dispatch, movement control, ramp, check-in and fueling – so process stability is safeguarded. Load distribution is done automatically, approaching optimum trim while complying with airline-specific loading rules. Nevertheless, the load controller can take over manual process control at any time.

- **Core** provides the load controller with all functionalities allowing for accurate and efficient flight handling and flight documentation (e.g., loading instruction, load sheet, messages).
- **Automation** adds automated flight handling and load planning to the core functionality, boosting productivity and optimizing the flight handling process.
- **Shift Manager** helps the load control supervisor to balance the daily amount of flights in an efficient manner between the available controllers.
- **PDA Solution** is designed for mobile devices, allowing the ramp agent to update the system directly from the apron.
- **Web Access** is a solution for easy interaction with other in-house departments or 3rd party providers such as freight forwarders
- **Analyzer** offers the capability of creating detailed reports.
- **Backup** achieves offline flight handling and document creation.

IOCC Management

The cross-functional integration of operations control, passenger recovery and crew tracking is amplified by specially-designed recovery tools and dashboards. They offer a new way of pro-active problem analysis and integrated decision-making and are unique in the market.

- **Integrated Control Panel** provides a complete overview of all KPIs (Key Performance Indicators) which are relevant and specific for your airline's operation. The KPI indicates problems with your crew, maintenance event, aircraft rotation, flight plan, passenger connection, load sheet, etc. in an integrated, real-time and cross-departmental way. The *Integrated Control Panel* monitors problem areas long before they materialize and offers a drill-down feature to analyze the root cause.
- **OCC Forecaster** supports anticipatory recovery under the aspect of "forecast, prepare, avoid" by dividing the handling of a disruption into three phases: forecast of a disruption, anticipatory problem analysis, and proactive problem resolution.
- **Integrated Solver xOPT** consistently delivers a recovery tool which seamlessly complements the integrated schedule planning (*Integrated Scheduling xOPT*) with integrated schedule recovery. It allows fast decisions within the shortest time possible, yet is aimed at the objective of an overall economical solution.



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